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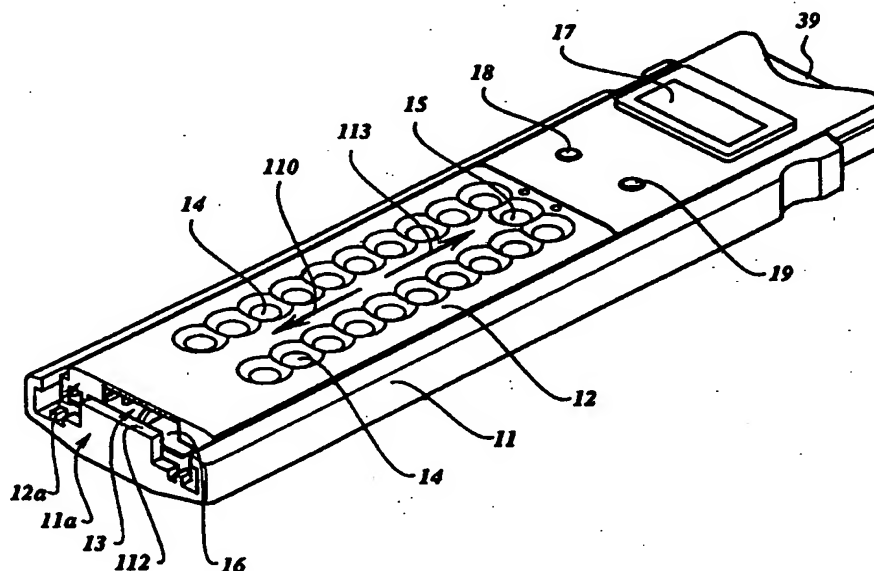
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(54) Title: MEDICINE EJECTING APPARATUS FOR A BLISTER-TYPE MEDICINE STRIP

(57) Abstract

Medicine ejecting apparatus comprising a chamber (13) between first and second housing parts (11, 12). A carrier (16) having ejection members (51, 52, 53) opposite the second housing part (12) is situated in the chamber (13). Opposite the carrier (16), the second housing part (12) can retain a medicine strip (82) of the type having one or more rows of blisters (83, 84) containing a medicine. Bottoms of the blisters (83, 84) are situated opposite ejection openings (14, 15) of the second housing part (12). The housing parts (11, 12) have toothed tracks (21, 31), and the carrier has hook members (41, 48) interacting with the toothed tracks, which hook members

are such that, if the housing parts (11, 12) are moved to and fro, the carrier (16) also moves over a distance of one tooth pitch and thereby presses a medicine out of a following blister (83, 84), through the bottom thereof and through an ejection opening (14, 15). At the end of the toothed tracks (21, 31), the housing parts (11, 12) have recesses (27, 31), and the carrier (16) interacts with spring means (43, 44), which are such that the carrier (16), after a medicine has been pressed out of a final blister (84), is unlocked from the second housing part (12) and can then be slid back free from the toothed tracks (21, 31), together with the second housing part (12). When a strip (82) filled with medicines is placed in position, the carrier (16) can be pushed back into engagement with the toothed tracks (21, 31) by the strip (82).



Short title: Medicine ejecting apparatus for a blister-type medicine strip

The invention relates to a medicine ejecting apparatus in accordance with claim 1.

A medicine ejecting apparatus of this kind is known from the American Patent Specification 4,858,207. Opposite 5 each blister of a medicine strip of the type having one or more parallel rows of blisters which contain a medicine, a first housing part of the known apparatus has a push-button, which can be pressed in perpendicular to the strip, counter to the action of a spring, for the purpose of pressing a 10 medicine out of the opposite blister and through an ejection opening of a second housing part. The push-button is substantially cylindrical and projects through an opening of a plate, which is arranged in the first housing part and can be displaced parallel to the strip counter to the action of 15 other spring means. The diameter of the said opening of the displaceable plate is sufficiently large to allow through a projection provided on the side of the cylindrical button. The projection has a run-up surface, the distance of which from the centre line of the cylindrical button decreases in 20 the direction of the ejection opening. When the button is pressed in, the projection strikes against the edge of the opening of the plate, as a result of which the plate moves in order to allow through the projection and to press a medicine out of the associated blister. When the projection 25 has passed right through the opening of the plate, the plate is moved back by the action of the spring means, as a result of which the button remains in the pressed-in position. When another button is subsequently pressed in, the same thing happens to this next button, but the previously pressed-in 30 button is returned to the starting position by the action of its spring. Coupled to the displaceable plate are switching means, which on displacement of the plate are operated so as to supply a control signal to a timer of the apparatus. On receiving the control signal, the timer starts a prede- 35 termined time interval. After the end of the time interval, the timer controls alarm means for supplying an alarm

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pressing-out direction, over a distance of only one tooth pitch. As a result, the ejection members can only press one medicine out of one blister of the medicine strip at any one time.

5 The order in which a medicine is pressed out of the blisters of the strip is fixed, so that mistakes in the order in which the medicines are taken are ruled out.

Apart from optional electrical means, the apparatus comprises only four components, namely two housing parts, a support and a spring. As a result, the apparatus can be
10 produced very simply and inexpensively.

By using electrical means, the apparatus can be made suitable for making the pressing-out of a medicine by means of displacement of the housing parts dependent on certain
15 conditions. If the medicines are contraceptive pills, the electrical means may, for example, be suitable for removing a block, which prevents the displacement of the housing parts, after an interval of 24 hours each time.

Since only one pill can be pressed out at any one
20 time, the number of pills pressed out can be counted reliably. The electrical means may, depending on the number counted, adjust the conditions for removing the block and an alarm message.

Other properties and advantages of the invention will
25 emerge from the following explanation, with reference to the drawings of a preferred embodiment of the medicine ejecting apparatus according to the invention. In the drawings:

Fig. 1 shows a perspective view of a preferred embodiment of a medicine ejecting apparatus according to the
30 invention, in a not fully closed position;

Fig. 2 shows a perspective view of a first housing part of the apparatus of Fig. 1;

Fig. 3 shows a perspective view of a second housing part of the apparatus of Fig. 1;

35 Fig. 4 shows a perspective bottom view of a medicine ejection member carrier inside the apparatus of Fig. 1;

Fig. 5 shows a perspective top view of the carrier of Fig. 4;

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blisters 83. The strip 82, shown by way of example, has 21 blisters for 21 medicines, which in this example are in particular contraceptive pills.

The second housing part 12 has two rows of ejection openings 14 and an intermediate ejection opening 15, which in the closed position of the housing are situated opposite the blisters 83 and 84, respectively, of a medicine strip 82 retained in the chamber 13.

A carrier 16, which is displaceable inside the chamber 13 in the longitudinal direction of the housing parts 11, 12, is situated in the chamber.

The medicine ejecting apparatus according to the invention may, as shown, have electronic means, which may comprise a message display screen 17 and keys 18, 19. The electronic means preferably comprise a timing device, as described in another international patent application which was filed today by the applicant.

It should be emphasized that the medicine ejecting apparatus according to the invention can also be used without electronic means of this kind for pressing medicines out of a medicine strip 82, as will become apparent from the explanation below.

It should furthermore be pointed out that the housing parts may also have different forms. For example, one of the housing parts may be L-shaped in longitudinal section, electronic means optionally being arranged in the short limb and it being possible for the other housing part to slide over the long limb on the side of the short limb.

Fig. 1 shows a situation in which the housing is not completely closed. When the housing is completely closed in the direction of the arrow 110, the left-hand sides 11a, 12a, in Fig. 1, of the housing parts 11, 12 will ultimately coincide.

As can be seen in Fig. 2, the first housing part 11 has two first toothed tracks 21 on either side of a guide groove 23, which extends in the longitudinal direction of the housing part 11. The toothed tracks 21 have first ends 24 and second ends 25, which are respectively situated

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When the housing part 12 is displaced in the direction 113 during a medicine ejection stroke, the projection 37 of the second housing part 12 strikes against the stop 29 of the first housing part 11.

5 The end section 35 of the second housing part 12 preferably includes the said electrical means 17, 18, 19, as well as an electrically controllable blocking member 38 and a switch key 39. The electrically controllable blocking member 38 serves, in a position in which the housing parts 10 11, 12 have been slid fully together, to prevent the possibility of the housing part 12 being displaced in the direction 110 during a period within which displacement is not permitted.

 The electrically controllable blocking member 38 may 15 be of various forms, for example a permanent magnet bar which can be moved into an electric coil which is arranged transversely to the sliding direction of the housing parts 11, 12 and whereby one end of the magnet does or does not block a channel for a projection of the first housing part 20 11. Small metal plates may be arranged opposite the ends of the magnet, in order to retain the magnet against one plate or against the other plate following excitation of the coil in one direction or the other.

 Another embodiment of the electrically controllable 25 blocking member 38 is shown in Fig. 3 and comprises a coil ~~with a core 38a, the axes of which are perpendicular to the principal planes of the housing parts 11, 12.~~ A flat armature 38b is arranged above the core 38a, which armature can be hinged about an axis which is perpendicular to the 30 sliding direction and the axis of the core 38a and which is situated between the core 38a and the key 39.

 Opposite the armature 38b, the first housing part 11 has a recessed end section or a recess 212. In the closed position of the housing, the armature 38b of the blocking 35 member 38 is situated in the recess 212. If the coil receives a suitable electric current from the electrical means, the armature 38b is attracted by the core, as a result of which the armature 38b moves out of the recess

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run-up surface, is situated between the hook members 41 for the first toothed tracks 21. The hook members 41 and the central tongue 43 are bent away from a principal plane of the carrier 16 towards the first housing part 11. The length 5 and the shape of the central tongue 43 are such that, following assembly of the housing parts 11, 12, the carrier 16 always tends to press against both housing parts 11, 12 (at changing locations).

Outside the hook members 41, the carrier 16 is bounded 10 by guide pieces 47 which are aligned with the hook members 48.

At the sides, and parallel to the second toothed tracks 31, the carrier 16 has resilient side hook members 48 with hook ends 49. The hook ends 49 are suitable for engaging 15 in the toothed tracks 31 of the second housing part 12.

On the top side, the carrier 16 has two outer ejection members 51, 52 and a central ejection member 53. The ejection members 51, 52, 53 are arranged closer in that order to the projection 29 of the bottom housing part 11.

20 The ends of the elongate guide sections 310 at the second ends 32 of the toothed tracks 31 of the second housing part 12 have a second recess 311 towards the bottom of the second housing part 12. A run-up surface 312 is situated at the transition from the guide section 310 to the 25 recess 311.

~~The operation of the medicine ejecting apparatus according to the invention will be explained below.~~

It should first be noted that Fig. 10 shows the principle of the operation of the apparatus when the carrier 30 16 is guided between the guide surfaces 26 of the first housing part 11 and the elongate guide sections 310 of the second housing part 12. For the sake of clarity, in Fig. 10 the side hook members 48 with the hook ends 49 are shown facing upwards instead of sideways. It will thus also become 35 clear that other orientations and forms of the toothed tracks 21, 31 and of the hook members 41, 48 are possible within the scope of the invention.

If, in the situation illustrated in Fig. 10, the

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housing part 12. The signal which is then obtained from the switch 315 can be used by the electrical means in order, for example, to count the number of medicines pressed out and/or to restart a timer.

5 When the central ejection member 53 has pressed the medicine out of the central blister 84 of the strip 82, the carrier 16 is pressed into the recess 27 by the spring force of the tongue 43, after which the carrier 16 is in the situation shown in Fig. 6. As a result, the hook ends 49 of
10 the side hook members 48 are released from the second toothed tracks 31 of the second housing part 12. As a result, the housing parts 11, 12 can be slid further apart, until the carrier 16 is pressed into the recessed end section 311 of the guide section 310 of the second housing
15 part 12 by the action of the spring tongue 43. As a result, the hook ends 42 of the hook members 41 are also released from the first toothed tracks 21 of the first housing part 11. The situation shown in Fig. 7 is then reached. As a result, the second housing part 12 can then be slid back in
20 the direction 110 in the first housing part 11, bringing with it the carrier 16 in the recess 311, until the carrier 16 strikes against a stop 65 (Fig. 6) at the end piece 112 of the first housing part 11. The situation shown in Fig. 1 is then reached.

25 To reach the starting situation of the medicine ejecting apparatus with a completely closed housing, it is necessary, when the housing parts 11, 12 have been slid sufficiently far apart (Fig. 7), for a strip 82 filled with medicines to be placed in the second housing part 12, in the
30 manner shown in Fig. 8. The carrier 16 is then lifted slightly out of the recess 311 by the filled strip 82. The height to which it is lifted is determined by filled blisters and is important for releasing the carrier 16 from the recess 311, as explained below. If the housing parts 11, 12
35 are then slid together, the carrier 16, as mentioned, strikes against the projection 65 of the first housing part 11. The end of each guide piece 47 of the carrier 16 is then pushed against the inclined run-up surface 312 of the second

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the toothed tracks could even have a rectangular shape. Furthermore, as mentioned, the apparatus may optionally have electrical means which prevent the displacement of the housing parts 11, 12 with respect to one another, optionally 5 for predetermined intervals.

Within the scope of the invention, it is also possible to replace the ejection openings 14 and 15 with one or more larger ejection openings opposite the bottoms of a plurality of blisters 83, 84 of the medicine strip 82. The ejection 10 openings 14, 15 or the larger ejection openings may moreover open into a receiving chamber with a single removal opening, which is arranged, for example, in the vicinity of the ends 32 or 33 of the second toothed tracks 31.

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48) are of a height which increases gradually in the pressing-out direction (113), the pitch of the toothed tracks (21, 31) is equal to the pitch of the rows of blisters (83) divided by the number of rows, and the ejection members (51, 52) are arranged on the carrier (16) staggered by a distance of the tooth pitch, viewed in the pressing-out direction (113).

2. Apparatus according to claim 1, characterized in that the carrier (16) has a further ejection member (53) for a single further blister (84) at the ends of the two rows of blisters (83), and the further ejection member (53) is arranged staggered with respect to the other ejection members (51, 52) by a distance of a whole tooth pitch and half a tooth pitch, respectively, specifically, viewed in the pressing-out direction (113) of the carrier (16), in front or after the other ejection members (51, 52) when the further blister (84) is situated in the first position or second position, respectively, of the carrier (16).

3. Apparatus according to claim 1 or 2, characterized in that one of the housing parts (11) is suitable for holding in the palm of a hand, while the other housing part (12), at one end thereof, can be pressed in oppositely to the pressing-out direction of the carrier (16), counter to the action of the spring means (28), over a distance of between one and two tooth pitches.

4. Apparatus according to one of the preceding claims, characterized in that spring means (43, 44) push the carrier (16) against the housing parts (11, 12), and one of the housing parts (11), at the second end of its toothed track (21), has a first recess (27) which is such that the spring means (43), in the region of the second position of the carrier (16), push the hook member (48), which interacts with the toothed track (31) of the other housing part (12), out of engagement with the toothed track (31) of the other housing part (12).

5. Apparatus according to claim 4, characterized in that the other housing part (12), at the first end of its toothed track (31), has a second recess (311) which is such

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second position of the blocking member (38), the housing parts (11, 12) can be displaced with respect to one another over a pressing-out distance of between one and two tooth pitches.

5 11. Apparatus according to claim 10, characterized in that one of the housing parts (12) has a switch with an operating key (39), the key (39) can be pressed in counter to the pressing-out direction (113) of the carrier (16), the switch supplies an enable signal, when the key (39) is
10 pressed in, to the electrical control means for enabling the driving of the electrically controllable blocking member (38) to the second position, and when the blocking member (38) is in the second position and the key (39) continues to be pressed in, the housing parts (11, 12) are displaced with
15 respect to one another.

12. Apparatus according to claim 10 or 11, characterized in that the housing parts (11, 12) are coupled to a switching means (315), which during or after a medicine ejection stroke supplies an ejection stroke detection signal
20 to the electrical control means, and the electrical control means, beginning at a starting instant determined by the receipt of the ejection stroke detection signal, block the supply of a control signal for driving the electrically controllable blocking member (38) to the second position for
25 a predetermined time interval.

13. Apparatus according to one of claims 10, 11 or 12, characterized in that the electrical control means comprise a timer and alarm means connected thereto, and after a predetermined time interval from the starting instant until
30 a following starting instant, the timer controls the alarm means so as to enable the supply of an alarm message.

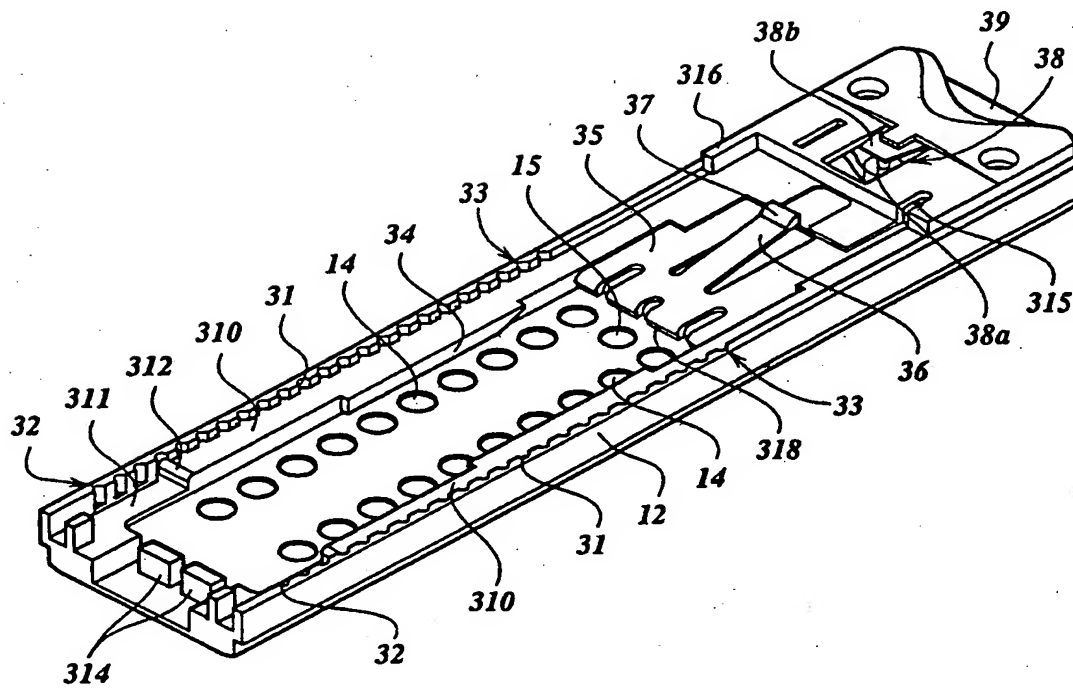


Fig. 3

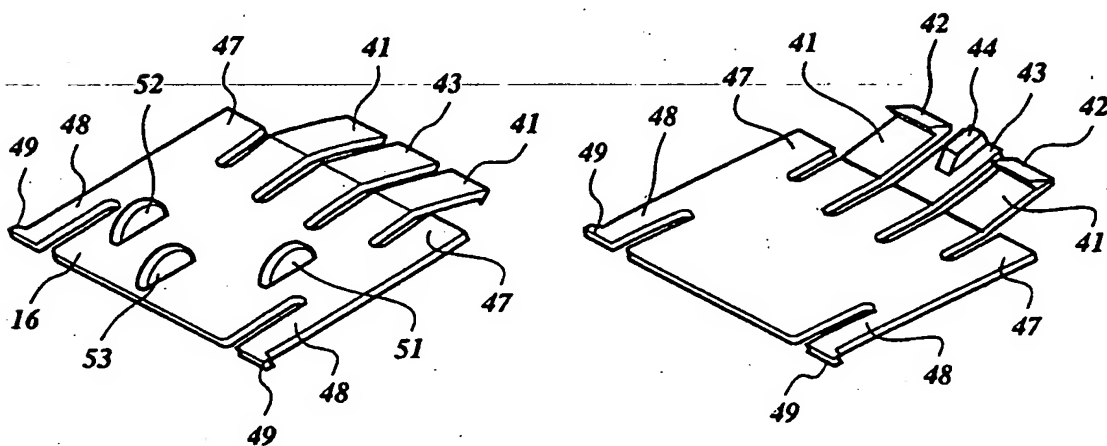


Fig. 5

Fig. 4

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/NL 97/00154

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